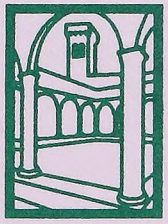
Jean Monnet Chair Papers

Joint Implementation and the Path to a Climate Change Regime

THOMAS C. HELLER



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THOMAS C. HELLER

1995
The Robert Schuman Centre at the
European University Institute

Printed in Italy in March 1995
European University Institute
Badia Fiesolana
I-50016 San Domenico (FI)
Italy

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Joint Implementation and the Path to a Climate Change Regime

At the Rio Earth Summit in 1992, the international community set off on the task of constructing a global regime to deal with the problem of climate change. The task is universally recognized to be notoriously diffcult and complex (note Le Monde 1994). In part this difficulty stems from the political ambiguity that attends a problem characterized by substantial scientific uncertainty (note Haas on epistemic communities). Climate change is afflicted by both a lack of clarity about the probabilities of temperature increases and the valuation of their associated damage. Although there is a reasonable consensus among atmospheric scientists about the overall direction and range of probable effects on climate of greenhouse gas emissions, there will remain for some time debate about the specifics of interaction between the bio and geospheres as well as argument about local and regional effects of systemic change (note Schneider, Greenhouse Effect). And while these uncertainties would counsel some form of current international action as insurance against the more extreme consequences of these events, political actors always resist the imposition of immediate costs to deal with long run and risky benefits.

If this were not sufficient, the timing of the constitution of a climate change regime is equally inpropitious. The Earth Summit coincided with a widespread, generally justified, disenchantment with the orthodox instruments of public governance, including the regulation of the environment. The period around the end of the Cold War has been marked by a unprecendented interest in the establishment of unencumbered markets and the political economic virtues of competition. At the same time, to all but ideological purists, it remains clear that markets in defined situations (such as the presence of common property resources) are incapable of allocating resources optimally. The infirmaties of orthodox regulation implies no escape from the dilemma of accounting for internalizing social costs and benefits after the demise of its traditional instruments. This dilemma has become been the focus of attention in the reconstitution of governance instruments in the internal affairs in many nations. One line of reform in domestic systems experiments with the replacement of the familiar reliance upon public monopolies as suppliers of social goods by vouchers and/or mixes of competing public agencies and private firms. A second product of the same instinct is the substitution for standard setting regulation of economic instruments including social cost taxes or property rights. In these cases, the state sets either the price of factors external to unregulated markets (taxes) or the quantity of a collective harm allowed (quotas or permits) and then allows the market to decide how to minimize resource costs. The locus of public policy is moved away from bureaucratic organization and its associated problems toward market correction through limited periodic interventions. While, until now, these initiatives have largely

been concentrated at the domestic level, the logic of the world after regulation has equal application to prospective international regimes.

The position of business interests toward climate change has been a continual concern of the process of institution building inaugurated at Rio. Of course, in some mythical world, business would prefer to go on consuming environmental services free of charge as they long have. However, an increasingly large segment of the leading edge of the business community has recognized that this is no longer a realistic position. Faced with a necessary choice between traditional regulatory mechanisms and economic instruments, the advantages of the latter for organizations whose expertise is least cost production is apparent. In this vein, during the preparation for the Earth Summit, the Business Council For Sustainable Development (BCSD), published the book *Changing Course*. *Changing Course* proposed a wide agenda for collaboration between the business community, public and other private actors concerned with the global environment. Two of its recommendations are central for our purposes. First, the BCSD recognized that the successful design and implementation of the fundamental social institutions of developed societies, from a modern telecommunications infrastructure to social security, have grown from a cooperative relation between government and the leading edge of business. An inability to forge a common commitment to new policy initiatives shared between empowered elements of the public and private sectors has been the usual hallmark of failures to adapt to the challenges of modernity. Second, the BCSD asserted that better functioning institutions of advanced political economies were managed by means of economic incentives rather than bureaucratic regulation. These two insights led the Council to argue that business ought undertake an active commitment to the resolution of the common threats posed by climate change and biodiversity loss and work toward the enactment of a new international legal regime that facilitates learning, pluralism and resource economy.

The discussion of the development of joint implementation (JI) should be understood in the light of these orientations to environmental policy. Economists, whether in academic armchairs or government policy debates, have little trouble imagining the basic shape of their ideal regime for global climate change. The regime's key features would include:

(1) reliance on taxes or tradable permits in an inclusive (complete) market or taxing jurisdiction that will give private actors the proper incentives to seek out and make use of least cost solutions that are economically efficient and will tend to reduce political opposition to their enactment and implementation;

(2) compensation for recognized property rights exchanged as the uses of resources are shifted through decentralized markets;

(3) low cost monitoring of the ways in which resources are actually employed to verify compliance with contractual and financial obligations assumed in market transactions; these monitoring strategies should rely, wherever possible, on the use of incentives such that those affected by changes in resources allocations have private interests in compliance (such as employment or reputation effects) ;

(4) decentralized systems that are able to learn and retain flexibility in a context of substantial uncertainty and risk;

(5) comprehensive solutions so that economic actors are not induced to substitute actions that escape the reach of the system; such substitutions are less desirable to private actors than the behavior they give up because of the legal regime, but do nothing to lessen the public problem which the regime was enacted to ameliorate.

Even if consensually accepted, each of these goals, poses difficult challenges for the design of a global climate change system. It would be foolish to deny the effort and ingenuity needed:

(1) to establish new procedures for setting global emissions targets which function as social insurance mechanisms against an uncertain probability of high damage risks (global warming);

(2) index fairly the value of reducing emissions of alternative greenhouse gases and carbon sinks;

(3) allocate permit quotas or tax liabilities between nations and among stakeholders within nations;

(4) create deep and efficient markets for trading of present and future pollution rights;

(5) develop innovative monitoring and compliance technologies.

It would be even more foolish to act as if political actors in the international or national arenas share either the sense of the economic community that insurance against high cost risk requires current precaution or the faith that the era of direct regulation has been left behind. Wide differences in perceptions about the appropriate design of public institutions, the equities of environmental responsibility, the willingness and capacities to pay for environmental services, and the breadth of the agenda for ongoing negotiation remain after the ratification of the Rio framework treaties. Without normative clarity in international law and with widespread confusion about the shape of political alliances in the post-Cold War period, it is unlikely that there will be a breakthrough for some years at the multilateral level that will fill in the Rio frame-

work with detailed protocol commitments. Yet there are several elements of what has already been achieved that can provide a foundation for optimism and experimental learning during a period of relative stasis. These include the acceptance of a soft target of stabilization of greenhouse emissions by the year 2000 at 1990 levels by Annex I or industrially developed signatories and the licensing of joint implementation as one method of pursuing those targets.

In the simplest terms, we can define joint implementation as the investment of funds by actors in nations with high costs of meeting environmental obligations in other nations that afford lower cost opportunities (environmental assets) for emissions reduction or sink enhancement. A JI regime envisions private investment under public rules that credit the production of environmental assets abroad against environmental liabilities at home {note: see below for examples). The same results could be achieved more indirectly in a mature regime of tradable permits. With a global market for emissions rights, a firm subjected to environmental obligations in its home jurisdiction would, depending on relative costs, either reduce pollution internally or purchase rights at the going world price that would permit it to emit the level of pollution it actually causes. The seller of the permits could then invest the sale proceeds to support the production of low cost environmental assets and retain the gains from trade that motivate the exchange. Relative to this ideal, JI can be regarded as a useful, but temporary way station. JI represents an imperfect market between two, or a limited set of, parties. In these incomplete and restricted markets it is to be expected that transaction costs may initially be expensive, contractual prices may vary widely around what would emerge in more perfect markets with numerous buyers and sellers as the competitive equilibrium value of environmental assets, and substitutive or inefficient behavior will be common.

In spite of these predictable problems, JI can offer genuine value as a learning phase through which we can enhance the understanding of environmental regimes organized through market instruments. This value will remain especially high until the moment when there is sufficient political salience for the problem of an effective, universal regime for climate change to resurface and an adequate revision of the diverse political expectations now held among nations to allow its solution. In the meanwhile, the amount we are able to learn about how we ought ultimately to structure less imperfect market regimes will depend on how widely JI is accepted and allowed to evolve as a pragmatic expedient. At present this acceptance is hindered by two mutually reinforcing misperceptions. First, environmental or economic purists may point to complexities in building a JI regime (e.g., the problem of how to monitor a JI project or how to define a baseline) as particular difficulties of joint implementation, without realizing or acknowledging that the same problems must be solved by any regulatory or market based regime. While it is important to admit that JI suffers the limits of all incomplete global regimes, it is precisely

because its legal form is basically homologous with other market based regimes that JI can function as an experimental tool.

The second barrier to experimentation with JI as an environmental regime is that it is still treated by most private actors, as well as by home and host governments for joint implementation projects, as a species of institutional exotica that merits distrust. Rather, JI ought be conceived as simply another variety of foreign investment. The principal distinguishing feature of a JI project is that all or a part of the investment return is taken in the form of a offset of a potential liability in its home country instead of as a normal monetary flow. The investment return in offset credits can easily be combined with more orthodox monetary flows to some or all of the investors. It may prove particularly useful in projects where JI investments supplement governmental funds from national or international actors (e.g. the Global Environmental Facility or the World Bank) such that the total flow of public and private, monetary and offset, benefits adds up to shift the most valued resource allocation away from current uses toward more sustainable development. JI's odd feature of including a private non-monetary return in the total project income stream poses some interesting administrative issues for the home country which must certify the offset as a legitimate substitute for other action its investing citizen would otherwise be required to take. In addition, private actors will face for a time exceptional transaction costs as they institute procedures and develop knowledge that will allow them to evaluate this type of foreign investment as well as they do those projects with which they are now familiar. However, beyond these innovations, there is no reason for public or private actors to treat joint implementation as more or less desirable or dangerous than other international flows of capital and services.

In the remainder of this paper I would like to develop further the arguments that: 1) JI is a good platform on which to examine the nature of the market based environmental regimes; and 2) that governments and firms should treat JI as a normal member of the familiar family of foreign investments.

JI as a variant of an (incomplete) market environmental regime

Many of the basic features of a full trading system in emissions rights that argue for the superiority of markets as a global environmental regime appear in homologous form in joint implementation transactions. Each JI deal automatically compensates recognized property owners for the shifts in resource allocations they permit and encourages the discovery of least cost solutions within the boundaries of participating jurisdictions. At the same time, JI transactions also require a resolution of most of the problematic issues that will have to be confronted if a viable market regime is to be institutionalized. For example, each JI contract would have to specify provisions for verification and monitoring to assure investors and public authorities that there was compliance

with contractual terms and crediting procedures. Each transaction would have to index and place values upon the several emissions source reductions and sink enhancements that are proposed. Perhaps the hardest theoretical and political challenge of market based regimes would be the assignment of tradable permits or tax liabilities, the point of origin from which market transactions would flow. In the case of joint implementation, this issue shows up as the establishment of a legitimized baseline or business as usual scenario against which incremental environmental gains financed by foreign investments will be measured. While the challenges in JI cases of determining compliance, valuation and baselines are real, it is equally true that lessons learned in meeting these challenges would translate well into the design of the deeper market regime at which we ultimately aim.

Beyond the utility of joint implementation as a learning exercise about central features of a prospective global market oriented environmental regime, there are several strategic advantages of proceeding through JI in the shaping of that regime. First, a global property rights regime negotiated between sovereign nations would logically proceed through an allocation of tradable permits among them according to some politically determined formula. Especially in those nations which received a supply of permits that exceeded their emissions of greenhouse gasses and thus created a surplus available for sale, it is likely that these permits would be treated as national assets. The proceeds from sale would then accrue to the national treasury. The difficulty with this schema is that there would be no necessary link between the compensation paid to the seller government for pollution rights foregone and the incentives for local actors in the selling nation to alter their behavior in a way consistent with environmental objectives. The recent history of developing nations is littered with the remains of accords between the central state and international actors that failed because they prescribed no effective mechanism that changed the incentives of the local parties whose conduct most mattered. JI projects are relatively less likely to fall into this policy trap since the process of authorizing credit for proposed transactions will surely in part focus on the project specific probabilities that the claimed emissions savings or sink enhancement to be purchased will eventuate. This will drive investors in the framing of the deal to negotiate with local actors essential to this realization. In other words, an impersonal market between investors and nation state permit owners leaves the question of translating the seller's commitments to reduce pollution into effective internal programs outside the scope of the specific trade. JI has the virtue of internalizing this design problem.

We may note two further advantages of joint implementation in relation to the process of building an ideal international regime for climate change. One of the problems of regime negotiation in comprehensive fora such as the United Nations is the inclusion of a variety of national actors whose principal interest is to block progress. These states may even become signatories to a framework agreement like those signed in Rio because they take on no legal

obligations of substance and maintain a (negative) voice in the continuing working out of implementing protocols. JI is by its nature selective or non-inclusive. As long as the international negotiation process does not seriously constrain the ability of willing nations to authorize their private firms under domestic law the engage in these transactions, JI projects may be restricted to those national environments which are favorable to learning through experimentation. The potential for blocking coalitions to form and cut off this path of institutional development is limited under JI because of its local or bilateral character.

Finally, the value of JI as an environmental instrument will depend on the development of an appropriate institutional infrastructure in the major potential investor nations such as the United States, Japan, Canada, the European Union. While it is not essential that the JI national regimes be identical, there is good reason (see below pages) to favor coordination of standards and procedures that lower transaction costs for private firms present in the several national markets. This coordination, whether pursued through the OECD, IEA or on a more ad hoc basis, would advance the practice of minilateral regime formation that could be extended to other, more comprehensive economic instruments. In a political context like the UNFCCC in which agreement on inclusive multilateral regimes may for some time be impeded by widely divergent expectations or agendas in the wider community of nations, the leading edge of institution building may be displaced to regional or minilateral arrangements. In this circumstance, JI can be seen to trace out the initial steps on an alternative route to global regimes through stages or partial accords. In turn, these minilateral solutions may feedback to alter the expectations held by other nations about their evolving prospects for gain or loss in yet more comprehensive negotiations.

In sum, we have argued that joint implementation is a useful first phase in the construction of market oriented environmental regimes for two reasons. JI projects will allow participating firms and governments to define many of the critical elements of all regimes that rely on economic instruments on a project by project basis where the stakes are low and flexibility or learning can be maximized. Moreover, there are particular gains associated with selectivity and local incentives built into JI projects that are not directly available in a wider market regime. Correlatively, since we began from the proposition that the final goal of a JI phase was to move forward toward a comprehensive global market, it must be the case that JI is in important ways an inferior option to be surpassed in later complete regimes. The relative defects of the JI program do not stem from the difficulties of resolving tough questions like baseline definition or monitoring since these problems are shared with all competing environmental regimes. Rather, the weaknesses of JI arise mainly from the fact that it forces the internalization of the costs of climate change only in a restricted set of transactions (see Bohm). Incomplete legal regimes create incentives to substitute away more taxed alternatives. For example, if

utilities in California would find JI attractive due to decisions of the state Public Service Commission that would deny rate adjustments for future liabilities associated with fossil fuel emissions, this incentive would be undercut by deregulatory rules that permit the import of power to the California grid from out of state jurisdictions which do not require cost internalization. Although substitution is a problem of all partial regimes, JI by its nature is incomplete. Similarly, a JI regime as partial may face general equilibrium problems. If a JI project to increase fuel switching in China induces power generation through cleaner inputs like natural gas, the price of oil may decline as relative supplies increase. Other consumers may then substitute oil for power generation or transport so as to push emissions in the wrong direction. A comprehensive global market regime would eliminate these systemic effects that critics of JI will inevitably point to in opposing phased strategies for regime building. Nevertheless, unless one is more sanguine than I believe to be justified about the prospects for multilateral negotiations to agree on the nature of a comprehensive regime, the optimal course may be to favor those partial markets, including JI projects, characterized by relatively low negative substitution or price effects.

JI as a variant of a foreign investment: public and private issues

To many public and private actors, joint implementation seems an unfamiliar and exotic concept. In a sense this is true. The idea that an organization in one nation can meet its legal liabilities in its home country by taking qualifying action in another nation is novel. In part, this apparent rarity comes from the odd characteristic of climate change systems whereby emissions and sequestrations of greenhouse gasses are fully fungible in the upper atmosphere. This fungibility allows the design of extremely flexible solutions that are often inappropriate in cases where noxious effects are locally concentrated and those who bear them not easily compensated for their losses. In part, however, as we will see in the discussion of baseline definition, there are particular ways in which general problems of regulatory regimes manifest themselves in a joint implementation context that create an illusion of exoticness about these projects. I have suggested above that this illusion may vanish when it is understood that there is no escape from those asserted deficiencies that are really the limitations associated with our entire universe of policy tools. To illustrate this hypothesis, consider for a moment the wholly familiar case of budgetary or tax expenditures in public finance. First, we normally treat as a policy defect the fact that the tax system, like that of the United States, gives deductions to charitable contributions that would have been made without the tax benefit. The public expenditure produces no new behavior at the margin. Next, we worry about the incentives that arise from national health programs that transfer the cost of risk from individuals to the collective. Moral hazard undercuts the effectiveness of the expenditure. Finally, we sense the unfairness of giving tax breaks only for incremental private expenditures on research and development, when firms that long have invested in high and socially desirable lev-

els of R & D are excluded from the reach of the incentive. Each of these problems – inframarginal expenditure, moral hazard, meritocratic equity – defines one of the salient difficulties that plague the construction of a JI regime. They are not unique to JI, but they will be cited to contest its value.

We might better understand the purported strangeness of JI if we see that it results from the combination of four specific features. These are:

1) complexities in the home country of the investing organization that are common to all public policy instruments;

2) political and economic sensitivities that attend the receipt of foreign investment in the host country of the JI project;

3) the abnormality for businesses of investing in projects with return streams that:
a) include non-money flows, and
b) often aggregate disparate public and private benefits.

These novelties are enough to make the design of a JI regime a challenge. Properly conceived, they do not transform JI into either the new species of colonialism feared by some third world delegations in recent international negotiations or an avenue for the evasion of environmental responsibility portrayed by green purists in the first world. JI presents no more or less than an interesting, if imperfect, exploration of a market based environmental regime and a variation on the well known theme of liberalized foreign investment markets that has been embraced by more and more nations in the post-Cold War era. To look at the dimensions of the novel and familiar in JI, we can consider in turn the issues this particular investment poses for its central participants: home or crediting governments, host governments, individual firms, and market making organizations like the BCSD.

Home or crediting country issues

1. General issues presented

Most foreign investment projects have not placed administrative or regulatory burdens on the home country of the investor. In general, legal norms of extraterritoriality have limited the regulatory processes of home nations to their water's edge. The case of JI is more like a hypothetical program wherein a nation granted tax benefits or subsidies to its firms for investment programs they undertook in other parts of the world. In the latter instance, a home nation would have the same interest in taking steps to ascertain the effectiveness of the extraterritorial policy for which it was paying as it would normally have in its domestic sphere. Since JI requires a government to allow its in-

vestors the benefit of not meeting liability standards at home, the government would have a similar interest in monitoring JI projects abroad to be certain that effective compensating measures had been instituted. The occasion of such an investigation would be the certification or accrediting process wherein a home government is asked to offset a legal liability (or the threat of a liability) that would otherwise fall on the investing organization.

From the standpoint of the design of an international regime, we might ask whether such home governments can be expected to bear the primary responsibility for assuring the integrity of the projects. First, let us assume that a government faced with deciding whether to accredit a JI project has a serious commitment to enforcing environmental liabilities at home because it accepts the idea that they improve the welfare of its citizenry. This compliant government would then bear the costs of ineffective JI investments which do not yield equivalent social benefits to the losses incurred by the failure to reduce domestic emissions. In effect, such a state has identical incentives to ensure that either JI or domestic projects meet national targets. While it may be suggested that the costs of monitoring are lower at home than abroad, these costs can be internalized to the parties in the JI transaction. Since it is the total returns of alternative investments that matter, relatively higher transactional costs in JI contracts will only reduce the gains from trade derived from the differential productivity of environmental assets in competing domestic and JI investments. Well structured JI projects that go forward remain the efficient option. On the other hand, if an Annex I nation chooses to ignore its UNFCCC targets, the possibility of cheating through JI as well as by means of domestic instruments will not a priori make its behavior as an international scofflaw either any less detectable or condemnable.

Although there has been much contention about the merits of the most commonly discussed JI projects, carbon sequestration through afforestation or reforestation, as well as much misunderstanding of their intent and impact (see below page), we may use such a case to illustrate the categories of issues that normally will have to be resolved by the government of the nation which is home to the investors in the JI project. First, the home government would have to evaluate a suggested schedule of the projected net benefits from increased forestation, in units of carbon sequestered or some other more comprehensive index, that would be available as a potential offset over the life of the project. This would require data on the carbon economy of the plants and soils in the project, expected growth rates or carbon storage trajectories, and the end life uses of the biomass involved. Second, to show there is an incremental benefit abroad that justifies release from legal liabilities at home, it would be necessary to establish a baseline or a contrary to fact (business as usual) scenario that would measure the added sequestration yielded by the project relative to that which would have prevailed in the absence of the investment. Third, there would have to be accepted methodologies to monitor the project and ensure correspondence between the suggested schedule of ben-

efits and actual sequestration. In this regard it would be useful for JI proposals to include consideration of the incentives they provide that can increase the probabilities of compliance by local interest groups affected by the prospective changes in resource uses. Fourth, to the extent that benefits once credited might be lost through an unexpected curtailment of the stream of environmental services, there might well be need for the contracting parties to describe an insurance mechanism to allow the replacement of the lost offset capacity. In these issues forestry is similar to potential JI investments in fuel switching, demand management, technology development, agricultural practices and improved industrial or transport efficiency. In all cases, home governments concerned about the integrity of their crediting process would have to ascertain that each JI investment prospectus persuasively demonstrate it has provided adequately for evaluation, baseline definition, monitoring or compliance, and insurance.

2. Baseline definition

While the design of home nation standards and procedures for the evaluation, monitoring and compliance, and insurance dimensions of JI merits serious study and imagination, I would like to focus the analysis for the present on the subtleties of baseline definition. Baseline definition is central because environmental policy innovation is motivated by the effort to alter existing behavior. Unless one can agree about the pre-policy status quo, there is no hope of specifying what will count as an induced alteration or would allow us to argue that the functional analogue to a public expenditure (a release from liability) is justified. The baseline problem is therefore the foundation of further analysis and present itself in one form or another in all market oriented environmental regimes.

The inescapability of baseline definition problems can be seen across the range of economic instruments related to JI. For example, in the debt for nature swaps that explored markets in conservation services, non-governmental organizations (NGO's) often purchased the discounted dollar-denominated debt of third world nations, exchanged it for local currency at favorable rates, and then contributed the proceeds to expand national parks or increase conservation enforcement budgets in the target country. If the result of such swaps would have been no more than a substitution of swapped funds for normal public budget allocations or a diversion of deforestation toward another region of nation, the willingness of investors to engage in these activities would have collapsed. The baseline of existing trends in conservation had to be set and the incremental resources monitored in a satisfactory manner for the market to be sustained. Similarly, new returns from biodiversity prospecting can add to conservation stocks only if there are recognized commitments that define the existing baseline trajectory of domestic governmental allocations. Even when we speak of complete global or regional markets for tradable permits, there must be a starting distribution of permits that allows trading to begin. That

initial distribution is the functional equivalent of the baseline that sets the origin point for JI projects and will induce the same (mal)adaptive behavior. It does not matter if we imagine initial global allocation formulas as different in their economic and political consequences as rules that distribute pollution rights in proportion to gross population or to existing (grandfathered) emissions, it is to be expected that nations will engage in anticipatory efforts to raise their quotas and transfer costs to other parties. The dilemmas of baseline definition will trouble more complete environmental regimes just as they will JI and will import equally intractable policy choices. However, I believe it far more likely that these dilemmas can be successfully confronted at the level of individual home countries working out national JI regimes than at the level of multilateral negotiations contesting the global formulae of permit distribution.

Before trying to generalize these problems analytically, we can outline the central issues of baseline definition through anecdotal narratives.

1. The Asian Wall Street Journal in an article on the growing contamination of China associated with rapid economic growth recently reported the following interchange between a rising entrepreneur and an official of a Hong Kong firm offering energy and environmental services. "The story is always the same: 'We'd love to do it. Can you lend us the money?' Then the guy gets into his Mercedes and drives off." The lesson of this anecdote is that every expenditure program that offers to subsidize economic activity presents a temptation to alter behavior so as to increase the size of the expenditures. If third world countries can sell off their environmental assets to foreign investors (who in turn receive public offsets in the home nation), there will be a natural inclination to expand that portfolio of assets as far as possible. This inclination leads to a **moral hazard** that national baselines of regulation or public budgets for the environment will be left low or even cut back in order to externalize as large a percentage of these costs as possible.

2. Assume that two nations in Central America have adopted widely disparate policies that have affected the conservation of primary forests. As a result an overwhelming percentage of the land in one nation is has been cleared for pasturage and agricultural use, while more than a third of the original forests in the other remain in tact. It is decided by NGOs in North America to create a JI capital fund in which investors may receive offset credits for investments whose proceeds are used to induce farmers across Central America to switch to new crops and agricultural methods that are consistent with the reforestation in native species of substantial tracts of currently cleared land. There is no dispute that the fund is effective in bringing about these changes and therefore that incremental carbon sequestration is a direct result. If the baseline is set such that the nation which had previously neglected forest conservation now has a larger portfolio of deforested assets to sell to the fund, the

outcome would seem to threaten **meritocratic inequity** to its neighbor which had previously internalized the public costs of carbon emissions of its own accord.

3. Thailand also has substantial areas of desiccated lands due to long term deforestation and pasturage. It is learned through bioprospecting that an extract from a particular tree never domesticated has non-toxic pharmaceutical properties. JI investment is attracted to develop a plantation and associated manufacturing activities to: 1) produce the extract for the commercially marketable extract; 2) reforest the desiccated region with an ecology that sustains a wide range of biodiversity; 3) yield a sustainable timber harvest with measurable increases in net carbon sequestration. Income streams from the new project are valuable to pharmaceutical companies interested in a monetized return, to international funds like the GEF that finance biodiversity gains, and to energy utilities interested in carbon offsets. The baseline for carbon offsets must in some way reflect the issue of which investment is **extra-marginal** in the sense that it will be treated as the necessary factor that should have caused the conversion from the less to the more sustainable resource use. In this case the marginality problem derives from the presence of *joint and multiple returns* between the several public and private beneficiaries. Other examples developed below examine equally difficult and common marginality problems associated with *political misallocations, information failures and lock in effects (installed bases).*

To expand and generalize from these brief exemplary JI narratives, we can formulate the range of issues they pose through an index of simple hypothetical cases:

Case #1: Commercially viable sustainable development

A chemicals firm in Missouri develops a new form of nutrient for cattle that has the effect of improving digestion in the cow's first stomach. The nutrient can be combined with other dietary supplements and manufactured for sale in India and other third world sites. The results of adding this nutritional element to cattle feed is both to increase sustained milk yields and quality and to reduce the belching out of methane by cows so nourished. The reduction in methane release is measurable by a relatively inexpensive monitoring device that is worn as a collar and does no harm to the animal. When the total price of the nutritional supplement, including cost of delivery to the cattle raisers, is established, it remains less than the increased value of the milk yielded. Can the chemicals company claim JI credit for the scientifically determined amount by which monitors show that methane emissions per cow have been reduced relative to the emissions from cows not so fed?

Assume Project #1 has an opportunity cost of X. X then defines the highest and best valued market use of the resources employed in Project #1. Assume that there is an alternative proposed resource use in Project #1 more consistent than X with principles of sustainable development and therefore a potential creditable JI investment with the following characteristics:

1) Private benefits (profits) to level A;
2) Local public (national) external benefits (e.g. local pollution reduction relative to the market use) to level B
3) Public (int'l) biodiversity benefits to level C;
4) Public (int'l) climate change (carbon) benefits to level D

Then suppose that:

a) $A > X$

Other things being equal, instance a) seems an easy case for which to set a JI baseline. Case a) would presumably not qualify for JI credit since the sustainable development alternative would be the private solution in efficient markets without any need for public intervention. The addition of public resources to the private return would be inframarginal as it would not have changed the ultimate use of resources. Thus, should there be additional public benefits at any level of government from resource use A, the usual practice is not to pay for them and share the costs with the private investor. This result probably reflects the view that public resources are inevitably scarce and could well be applied to other projects where they induce changes in behavior. We may note that although a public expenditure to pay for the collective benefit consumed would not alter the use of resources, it would affect the distribution of income. Nor will it always be the case that equity norms will prefer to leave the full costs of a project with multiple returns on private investors since an increased income stream (A + C + D) to the private actors might be considered a more just distribution than that which would result if no tax costs were imposed to finance a public subsidy of the project. This equity issue in JI cases may be especially salient if the collective benefits are external to a poor host nation and the only commercial income stream is internal. Whether this equity argument would be compelling to home nations remains doubtful since they are unlikely to see offset crediting as a preferred vehicle for the delivery of foreign aid.

Case #2: Local failure of to internalize social costs

An Osaka energy services company proposes to install home cooking stoves burning natural gas in place of coal burning stoves now common in South China. The price of the coal stoves and the coal to fuel them is

less than the natural gas stoves and their fuel units by an amount such that private consumers do not buy them of their own accord. However, the coal stoves produce carbon and sulphur emissions far in excess of those of the gas units. While the effects of the carbon emissions contribute to global climate problems, the effects of the sulphur emissions are overwhelmingly local and regional. If the municipal, provincial and/or national governments in China imposed well designed regulatory limits or emissions taxes on the sulphur emissions of coal burning stoves to reflect only the pollution costs borne in their areas, substitution of natural gas units would become wide spread. Sulphur and carbon emissions are directly correlated so that reductions the emissions of either brings verifiable reductions in the other. If the energy services company is able to claim JI credit for the per unit reduction in carbon emissions, it will be able to sell natural gas units for a price competitive with coal even in the absence of Chinese public action to alter the pricing of coal burning cooking. If there is no Chinese regulation or taxation in place, should the energy company be given JI credit by Japan?

Using Case #1 notation, assume in case #2 that A + B > X:

In case #2, the baseline might be set in at least two places. The problem arises from the fact that although economists will argue that the proper political duty of the state is to correct private markets for social costs and benefits not recorded in resource prices, this obligation is frequently abrogated in most societies and infrequently carried out in third world nations. Let us assume there is political failure to correct markets because the laws of the host nation of a prospective JI investment do not currently force the internalization of the social costs associated with resource use X. We might then note that the fact that total national private and social costs exceed the benefit of the existing private market use is irrelevant to revealed behavior and suggest that the JI baseline be set without relation to a hypothetical inclusion of social costs B. In other words, if the baseline setting agency ignores B, the influence of a JI investment can produce a change that would not have happened in its absence. Project certification would then plausibly be effective or extramarginal.

On the other hand, we might argue that a JI baseline be established that includes B, even when such action is not yet forthcoming in the home nation. It could be pointed out that if sustainable development is the preferred economic use with reference to the total private and social costs of the project internal to national jurisdiction by itself, then these projects should have been undertaken without JI. This policy would minimize the moral hazard problem that would lead host nations to minimize regulation of local social costs in the hope of qualifying for larger international transfers for their environmental goods. It would also min-

imize the equity problem between host nations that otherwise penalizes those nations that have on their own protected their environmental assets. The cost of this latter standard would be to limit creditable JI projects to those nations which have actually set high domestic standards and eliminate many key nations from participation whose political prospects for social cost internalization are low.

Case #3: Joint and multiple returns

An Indonesian mining company owns or has access to large tracts of Kalimantan land that abut a railroad right of way leading from its principal mine site to its dedicated seaport. The land is presently overwhelmingly in cattle pasturage, although earlier in this century it was primary tropical forest. The company proposes to reforest about 250,000 hectares of the current grasslands to a mixed pattern of exotics and secondary native forest. The exotics would be managed in a combination of uses for charcoal (used at the mine site), paper, and several types of lumber. All have commercial uses, but it is demonstrable that the total commercial value of the combined various income streams is not sufficient to make the project economically viable at projected interest rates. However, it is possible to calculate the carbon storage value of both the short cycle exotics, including the restoration of carbon to the atmosphere from the paper and charcoal end uses, and the long cycle native reforestation. It is also possible, in principle, to estimate very substantial biodiversity gains which result from the restoration of secondary forest and the reduction of the economic pressures to cut remaining primary forests for charcoal supply. Such gains could make the project eligible for investment from international funds for biodiversity or the Global Environmental Facility (GEF). Should JI credit be available to a European investor in the project for its carbon sequestration value?

In case #3A assume that $A + C > X$ or $A + D > X$:

These situations would appear to be relatively easy cases for JI baseline setting. In either case the public element is necessary to induce a change of behavior from X to sustainable development. When the international payor is a biodiversity fund in cases where C is the collective good being purchased or a JI certifying agency where the public expenditure is made in the form of a reduction in home nation liability, the investment is extra-marginal and does not present a difficult public policy issue.

In Case #3B assume that $A + B + D > X$, but $X > A + B$ and $X > A + D$; or $A + C + D > X$, but $X > A + C$ or $X > A + D$

Again this seems an easy case in theory since all public payments (here national and international combined) are needed to yield a change in resource uses. Since X > A + D, unless the host nation forces the internalization of B, even the addition of D as an external investment will be insufficient to induce the abandonment of X. However, there is no issue for the home country crediting agency which will be certain that its investment is extramarginal if the sustainable use is actually undertaken. This case for crediting JI can easily be extended to include multiple public agencies and collective goods. What may be of note about this instance is that JI private investment may be perfectly compatible with GEF or other public investment where only the aggregated value of these separate collective benefits is sufficient to produce resource uses consistent with sustainable development.

In Case #3C assume that B > X, and C > X, and D > X

Although this case may look extreme, it is only a version of a classic problem in public finance. The efficient use of resources is in sustainable development in all instances. The problem is only who is to pay for the change in resource use to allow all parties to consume the collective goods involved. It is as if two local communities will each gain benefit from the building of a common dam and power grid in a combined amount that exceeds the total cost of the project, but each is hoping to leave the great bulk of the cost on the other party. Again, as in case #2 the definition of a baseline that forces the internalization of local social costs will be attractive to the home nation of JI investors, but will restrict participation in JI and impose some equity costs on relatively poorer nations. Even if the baseline does not include benefits B, there will still be a contest between international agencies and home governments to divide the costs of the collective benefits of carbon and biodiversity.

Case #4: Political failure through inefficient subsidies

An American utility company wishes to enter into the development of co-generation facilities with agricultural producers in Brazil. The project involves the production of biomass fuels from organic wastes. Power would be supplied to the agricultural activities of the producers themselves and to the electric grid of the wider region. The price at which this new power could be offered exceeds the current price of alternative electricity from existing and planned hydro and fossil fuel sources. Competing power sources are supplied by a state monopoly which has traditionally operated at a loss and priced at low rates that reflected political objectives. In addition, much of the cost of the infrastructure of hydro power has been paid by subsidized capital from international lending agencies. Brazil has for some time been contemplating

privatization of its energy industry, but the shape of that legislation is as yet undefined. Biomass power would have verifiable gains relative to fossil fuels with respect to carbon and relative to hydro with respect to methane emissions. Should the American company be given JI credit for its investment in the biomass co-generation project?
In Case #4, let the opportunity cost of the private market solution again be X. However, assume also that X is a function of some local subsidy (not justifiable by correction for an unpriced collective benefit). Assume further that X' is the opportunity cost of sustainable development with the subsidy removed. Let A be the private return from an alternative use of the same resources consistent with principles of sustainable development. Finally suppose that $X > A$; but that $X' < A$. All other permutations from Case #1 can be played out on these assumptions.

Case #2 was based on the hypothesis that political failure occurs when the state does not adequately correct markets for external costs and benefits. Case #4 goes further to note that states just as often positively distort prices through the use of subsidies not associated with the purchase of collective goods. Orthodox economic analysis may quickly decide on these facts that the baseline should be drawn such that creditable JI projects would not be allowed if $X' < A$. This follows because if the private value of resources (A) exceeds the properly priced (non-subsidized or otherwise improperly distorted) value of X', then efficient private markets should have yielded A without external subsidy. Using the term in a broad sense, this could be classed as a "no regrets" solution because the economic value of A is larger than X' and therefore its implementation would maximize social well being. Economists could further point out that, as in case #2 above, a standard defining JI against a baseline that reflects X rather than X' would pose a moral hazard problem and offer no incentive to a host nation terminate existing subsidies.

Against this orthodox interpretation, it must be acknowledged that political failure of this type is nearly ubiquitous. The embeddedness of inefficient subsidies in many nations is extremely deep. The long standing consensus of economists that the collective will be better off if these subsidies are removed has had little impact on their continuing viability. The general problem with no regrets strategies of this type is that the same groups are not the beneficiaries and payers for the changes proposed. Since empowered groups are normally the disproportionate losers from the removal of subsidies, they have opposed reform where there is no political mechanism by which those who gain might have compensated them for their abolition. In this all too common situation, the contrary to fact assertion that better managed private markets should have produced resource uses consistent with principles of sustainable development may only prevent the growth of a JI market in projects that would not have occurred under routine and expectable political prac-

tices. This case is especially salient at present when many important potential JI services nations such as Mexico, Brazil, China and Russia which have traditionally subsidized many key sectors are for reasons unrelated to environmental policy moving toward market pricing policies. In other words, I am suggesting that political failure is an essential aspect of what we mean by business as usual and that the JI baseline definition merits special attention in periods in which the nature of what counts as normal politics is in contest.

Case #5: Information failures

Canadian farmers on the Great Plains routinely practice agricultural techniques that are based on deep tillage of the soils. Biologists and soils scientists have shown that the ability of prairie soils to fix and store carbon when so plowed is approximately one-third of their storage capacity when there is no comparable tilling. For reasons unrelated to carbon economies, a number of Plains farmers have taken up reformed agricultural practices based on organic or zero till techniques. Their recent experience shows that they do not suffer economic losses relative to traditional methods following their switch. Nevertheless, knowledge about these reformed techniques and their economics is not widespread and many government extension services and commercial interests still reinforce methods in place. Canadian investors are considering the establishment of a capital fund which would disseminate information about high carbon storage agriculture, provide ongoing consulting, and defray the minor costs of conversion to the reformed practices. Should participants in such a fund be given JI credit for their investments?

> In Project #5, let consumers or producers believe the opportunity costs of giving up an existing resource use be X. However, let the actual opportunity costs of abandoning this use be X*. Again, let A represent the private value of an alternative use of the same resources more consistent with principles of sustainable development. Finally suppose that $X > A$ but $X^* < A$.

The problem of incomplete information or behavior under uncertainty was not a major focus of analysis for much of the
formative period of neo-classical economics. In recent years it is better understood that information should be treated as a scarce commodity and that the economics of organizational and transaction costs must be analyzed treated with the same care and principles afforded the economics of production or transformation. The facts of Case #5 could occur because individuals or firms do not correctly perceive the value of gaining better information or because they rationally develop routine practices which they follow inertially in the absence of a reasonably certain demonstration that reform of these practices will improve their

welfare. The problem could also arise because of transaction cost problems in capital markets. There may be cases where the more sustainable practice would be privately beneficial over the lifetime of a project, but would involve heavier up front investment in reform than does the existing use. Even if the discounted long term benefit stream were positive, unless financing at the discount rate were available, the theoretically efficient investment will not occur.

Once it is known with a high degree of certainty that a change in established practice will leave consumers or producers better off in terms of their private benefit than they were, we can talk about a no regrets case in its pure sense. However, given that improvements in information may often be like a common property resource, private underinvestment in the quality of information may well legitimate a public role in discovering it. Pure no regrets cases then can present the best argument for public command and control regulation which imposes a mandatory standard defined by the demands of the improved practice to correct the information failure. This seems a relatively easy case in which to claim that the proper JI standard should allow only projects that are incremental to action that should have been undertaken locally. Such local behavior would be encouraged if crediting nations defined a JI baseline on the margin set by the corrected resource use. Only those JI projects would be creditable which reduced net emissions to a level below that which would result if the optimal regulation were enacted.

The principal limitation of this strategy is that there are probably many situations where it is not certain exactly what the corrected efficient standard of practice ought to be or where public investment in information failures is efficient. There may also be political constraints on enacting these standards as a matter of law. In cases where there is a good probability of finding sustainable reforms that offer private no regrets solutions, a JI investment to define best practice standards or facilitate their introduction could have an extremely high payoff. Since the adoption of a pure no regrets practice, other things remaining equal, will eliminate more environmentally costly uses in the long run, the environmental gains from a relatively small JI investment in correcting information failures in goods or capital markets would be self-sustaining. While this attribute may raise interesting problems for credit evaluation, it would argue that the baseline be set initially to certify such JI projects.

Case #6: Installed base failures

There are fifteen cities of between 2 and 12 million people in the coastal region of China that are experiencing large scale economic and population growth. At present much of the population is composed of migrants and other recently arrived elements living still under conditions that re-

flect the low incomes with which they came to the urban centers. It is predictable that continued growth will result in more permanent settlement patterns and increased expenditure on transportation expenses to and from work. Presumably, this settlement could be built upon alternative land use patterns that might be based relatively more on private automobile or mass transit. Widely different fossil fuel emissions levels would be associated with these several land use patterns. Even if it is considered environmentally desirable to adopt the more intensive settlement patterns associated with mass transit systems, available governmental resources to construct such systems are inadequate. The amount of public capital from GEF, World Bank or similar international sources is also limited in comparison with the magnitude of the task. Yet, once a trend toward land use patterns based on private cars has been installed, the pressures that arise from the growth of a Chinese automobile industry with its allies in labor and multinational firms will make deviation from that trend politically and economically unrealistic. If a joint public and private corporation were set up to deflect these Chinese cities along a path of low emission transportation systems, should international investors in that corporation be credited for JI? In what amounts and for how long?

> In Project #6 assume that X would be the opportunity cost of a giving up a defined resource use if the installed base of technology were in status S; but that $X^{\blacktriangle}$ would be the opportunity cost of the same project if the installed base of technology were in status $S^{\blacktriangle}$. Again, let A represent the private value of an alternative use of the same resources more consistent with principles of sustainable development. Assume finally that $X > A$, but that $A > X^{\blacktriangle}$.

In Case #5 the market failure that occasioned the problem for defining the appropriate JI baseline was that, for one reason or another, consumers or producers lacked the necessary information to order their economic activities in the way that maximized their private welfare. The provision of better quality information lay at the center of the policy debate. In Case #6, we can return to the more orthodox assumption that economic actors have adequate information to arrange properly their resource use choices. The problem is rather that the set of incentives and constraints that they are facing in the market leads them acting rationally to invest their assets in transactions that do not maximize social benefits. However, the problem of installed base does not present simply another argument for public correction of external costs and benefits. The special character of this issue is that once substantial capital investment has been made in particular forms of widely spread technologies or organizations, the social and private costs of starting over with another round of investment to support an alternative more sustainable production (status $S^{\blacktriangle}$) do not justify the incremental gains over those

available from the installed practices. (status S). In other words, once the infrastructure of status S is in place it can be rational for all private and public actors to stay locked in to the original status until capital depreciation or an external shock to the system alters these parameters.

Analyses that demonstrate that economic and organizational systems can be path dependent have become increasingly frequent in current institutional economics. In such cases, the operative question becomes why the system originally became locked in to an installed base that led to a long term sub-optimal equilibrium. It is sometimes possible to demonstrate that although there is some specifiable global optimum in which the system as a whole would be better off, there were no local incentives for actors to take the measures that would have allowed their coordinated actions in ideal markets to propel the system along the superior path of development. But arguments from path dependency also suggest the possibility that the operative economic definition of optimality may be arbitrary or a function of one's position within the internal history of an evolving complex system. Arbitrary in this sense implies that different and mutually exclusive patterns of resource use could each be defined as efficient depending on which of several potential development paths of the system becomes installed as standard practice. Once a substantial number of actors commit to rationally adaptive choices in production and organization technologies in the expectation that these standard practices will continue, there may be progressively fewer incentives for others to invest in alternative practices whose payoff will demand a broad range of complementary actions. Consequently, what is optimal before an evolutionary history is established may then differ from what is optimal at a later time within that history when the gains from some alternative use of resources become insufficient to compensate for the costs of the dislocation of resources and institutions in place. In this case, a central question for public policy will be to prevent private actors from investing in such a way that the adaptive behavior of others causes the evolving system to lock in or lose the flexibility to adjust its standard practices before the time when it is clear what is the optimal system outcome.

Instances of installed base problems have been studied in a variety of technologies from AC/DC electric grids to VCRs. But the analysis could well be extended to environmental services. As illustrated by the example of Chinese cities, if there were a commitment to automobile intensive transport, public authorities will face demands for more highway construction to reduce congestion, that land values and uses will reflect adapted consumption and production choices, and that coalitions of workers and capitalists will become politically embedded in an expanding auto industry. The dislocation costs associated with moving this installed base toward less fossil fuel intensive development may exceed the

environmental gains associated with mass transit, even though we can imagine alternative patterns of resource use that would be as economically valuable and more consistent with sustainable development if the overall system were deflected to a different evolutionary trajectory. In a theoretical framework that assumes that all organizations, public and private, act to pursue their local incentives, it would be naive to assume that governmental agencies will automatically see and enact policy solutions aimed at global welfare optima. The state is not a black box that can be relied upon to correct simple, let alone sophisticated, market problems.

In such instances, business as usual definitions of JI baselines must assume that the analytical specification of a global optimum will not lead either public or private organizations to act in a coordinated fashion to implement it at the critical moments where a system is approaching an inflection point of its possible evolutionary trajectories. Well timed and placed investments could tip a system along a path of development that offered incentives to rational actors to adapt their behavior to a system status more consistent with sustainable development. While the environmental gains from such strategic intervention in system development would be of a different magnitude than those likely to come from JI investments we have described in the previous cases, the problems of baseline definition and offset measurement would be proportionally increased. However, because so large a percentage of greenhouse gas emissions growth in the first part of the next century will come from China and other successfully expanding economies, the opportunities associated with investments in systems without widely installed bases of technology and with the pretension of organizational transition seem too large to ignore. By definition, in the next years the windows of opportunity through which JI and other policy instruments can attempt to intervene with respect to these systemic behaviors will be closing. At the least, maintaining an exploratory openness in the institutional development of the JI process which recognizes the complexities deriving from the installed base problem would seem an appropriate stance.

We might summarize this discussion of the definition of baselines by home governments by emphasizing that a process essential to the development of JI as an environmental regime will for some period remain beset by the interplay of conflicting policy principles associated with moral hazard, marginality, and meritocratic equity. The marginality principles seem easy to state in theory. First, in the usual case, public programs should not be expected to pay for behavior that private parties have incentives to undertake on their own initiative, even if that behavior yields additional public benefit. Second, baselines should be defined so that only future investment which would not have been economically justified in the absence of JI accreditation will be authorized. However, what we have seen is that the situation in practice becomes compli-

cated because of prevalent imperfections and irreversabilities in actual markets. Through the nearly universal failures to internalize social costs and benefits, economically unjustifiable political interference with prices, informational costs, and institutional rigidities many transactions that should have already occurred in idealized domestic markets have often never occurred.

The authorities of the crediting nation charged with JI baseline definition will have to decide where the margin of business as usual should be drawn. To impose an easy standard which qualifies any change from the status quo as extramarginal (and thereby eligible for JI credit) is a pragmatic admission of the fact that there is, and may persist, a broad, if not unbridgeable, gap between the domains of what ought to have happened and what actually happens in political economy. At the same time, the inclusive drawing of the margin has costs. It first threatens the anticipatory reduction of national legal regimes to create a wider portfolio of tradable environmental assets. Second, an easy rule fails to reward those polities that have imposed on themselves higher standards of environmental protection and who are then held to those more exacting standards by the ex post definition of business as usual. Finally, an easy rule will increase the level of political tension in the crediting country as left Green groups will find it easier to argue that the process facilitates the efforts of investors to evade their domestic responsibilities without clear gains to the global environment. In this way a permissive JI baseline standard will create a higher risk of delegitimatizing market oriented instruments. On the other hand, a hard rule which insists that all JI projects will be credited only when the host jurisdiction has done all that it should have done internally to establish the optimal local margin may err in the opposite extreme. A hard rule of JI qualification will limit the dangers of moral hazard and the inequitable treatment of the deserving at the risk of limiting participation in the environmental regime of less progressive, but potentially large emitting and sequestering jurisdictions. It is, of course, precisely these latter nations whose development paths must be modified if we are to cope successfully with the climate change issue. For public agencies trapped in such uncertainty of conflicting policy directions, the better initial focus may lie in the development of an adequate process than in the quest to specify ex ante the superior rule.

3. Legal process and dynamic games

There are two components of a home nation regime that must be established for JI to serve as a foundation for the further exploration of environmental markets. One is the crediting process on which the prior discussion centered and to which we will return below. The second is the driver or the set of incentives that will induce investors to seek an offset or non-monetary return from their JI projects. The question of the driver is complicated by the idiosyncratic national politics of the post-Rio period. In each of the Annex I nations, such as the United States, the European Community, Japan or Canada, there are relatively fixed, if soft, obligations to stabilize greenhouse gas emis-

sions at 1990 levels by the year 2000 and to report each year to the international community on their progress toward this goal. However, there are no specific legal obligations as to how they are either to structure domestic programs or mix voluntary and compulsory instruments toward this end. As exemplified by the US Climate Change Action Plan, the initial emphasis of many national programs will likely fall on voluntary compliance rather than the imposition of mandatory and enforceable emissions allocations upon domestic private and public organizations. However, as in invariably the case with regimes of self-regulation, an expressed willingness of actors to undertake potentially costly behavior may occur only in the shadow of the law and reflect the implicit threat that a more onerous governmental regime will follow if there is a failed private campaign to meet stated targets.

The interplay between self-regulation and the imposition of public controls sets up a dynamic game in the development of a JI initiative. In the United States the first step in this direction has been to create a national registry of voluntary actions taken by firms in pursuit of emissions reductions. If the quantity of registered actions should be large enough so that the nation meets its UNFCCC commitments, there would be no direct offset return to compliant firms. They would, instead, enjoy freedom from any later legal limits on their practices. Free rider and other collective action problems are obvious in this scenario. A second use of the registry would be to assure actors that any current investment in emissions reducing projects would bring a retroactive crediting against future legal quotas that may be imposed. The more credible the threat of future legal obligations, the more valuable this return from current anticipatory behavior. In this game, the government must mitigate political opposition to mandatory regimes by making clear their likelihood. Although free rider problems will remain in this second scenario, the threat of prospective liability will define a smaller class of firms that believes that its members will most likely bear a disproportionate burden of the future obligations (e.g. energy companies). This sub-sector will have economic and political incentives to work out the design of collective action programs that they hope can forestall subsequent, less desirable, legislative or administrative regimes.

In this context, JI qualification processes can become relevant to sectoral industrial groups that are persuaded that they will suffer a greater than average probability of becoming enmeshed in a coming legal regulation of the climate change problem. Such sub-groups of the broader universe of business firms will be more likely to enter the JI game at an early stage of its development in the attempt to influence the ultimate shape of the general rules which they are the least likely actors to avoid. In taking the JI game seriously leading sub-groups will legitimate and define the regime. They will also help to diffuse its practices by providing examples of its institutionalized operations and reduce for follower firms the transaction costs of organizational innovation. As long as there is: 1) a credible threat of public regulation; 2) a reasonable expectation established about the relative distribution of impact under that

regime; 3) an authoritative insurance that anticipatory action will count against any prospective liabilities; and 4) a belief in particular sub-sectors of potential regulatees that private collaboration and self-regulation in anticipation of general political constraints will yield preferable regulatory outcomes, it is possible to emulate the effects of a national driver in advance of its formal enactment. Whether any particular national government is capable of clear signals and coherent play of this dynamic game is a question of skill in local politics. There is no single path along which each Annex I nation must proceed in order to establish a credible commitment to its treaty obligations in the political discourse of its own system. However, without some adequate, albeit subtle, solution to the driver problem there will be no motivation to undertake JI projects within a wider portfolio of environmental transactions.

If an effective driver in put in place, the design of the working rules and procedures of an JI regime will occupy center stage. It may useful to think through this problem with reference to two ideal types of legal process. The dominant model of contemporary regulation is legislative or statutory. This model conforms to norms of clarity and equity in subsuming administrative decisions under announced and detailed rules. It reflects a convergence of two major currents of modern social thought which, on the one hand, favor positivist theories of governance that locate sovereign power in the legislator and, on the other, the planning competence and foresight of experts entrusted with central roles in the rule drafting process. The alternative ideal type of legal process can be imagined as a common law process. In this usage there is no intended connection between the concept of a common law process and the English common law whose name is being borrowed. The organizing principle is that the law sets into action an evolving process composed of a limited set of general standards or guidelines to frame decisions and an administrative body to interpret and apply these directive principles. The adjudicating body to which applicants submit petitions for decision may often be constituted to represent the most affected interests and other public agencies with overlapping jurisdiction over the subjects at issue. The key fault line between these models is that in the latter JI rules are expected to emerge through the crafting of a jurisprudence or case law over time. Rather than attempting through a quasi-legislative exercise to reconcile the conflicting demands of marginality, moral hazard and meritocratic equity into a statute that defines JI qualification, the common law model would rely on case decision and reconsideration to arrive only over time at a recognizable body of precedent.

Several arguments support the less orthodox proposition that the building an inclusive administrative process that will produce a common law jurisprudence is the better route to a functioning JI regime. First, the extended decision process offers repeated opportunities for interested private parties to be given a hearing on relevant aspects of the rule making procedure. These parties might more easily be precluded from realizing and voicing their concerns in a more concentrated program of defining a regime. Since much pertinent information

may well be supplied only by parties from the host country (e.g. moral hazard risks or monitoring capabilities), an open and continuing process may better elicit the involvement of the entire appropriate community. Second, the common law model is more flexible and conducive to learning in a field where both normative and factual understanding is still primitive. The early years of JI will be marked by organizational, scientific and political innovation and uncertainty. It is precisely in these circumstances that a knowledge production system that is explicitly evolutionary is likely to have competitive advantages over other institutions. Third, the development of a JI regime is a dynamic game at the international level as well as at the domestic level. Once any set of decisions is made public, it is to be expected that nations and firms will adjust their behavior to the signals they believe are being put forward. If the crediting authority makes use of the malleability of the canons of interpretation of precedent that characterizes most other common law jurisdictions, it will be easier to adjust the balance between competing general standards across the flow of cases to limit the gains from strategic behavior. Finally, the autonomy or self-regulation of a common law jurisprudence minimizes the costs imposed by individual mistaken decisions. The willingness to make errors to be corrected in later cases is especially important in the JI context. For investors to proceed with timely projects they will demand certainty of return through creditable offsets. This certainty can be offered either by fixed rules or by a quick administrative turn around of project applications. A common law based process that rapidly assured a certain return for each creditable project and yet retained a systemic ability to adjust the conditions of play for new proposals as the learning process went forward would be of the greatest worth in the formative period of a JI regime.

In situations marked by substantial uncertainty and putative high marginal returns to learning, case by case adjudication generally stands on its strongest footing. In the particular instance of JI the need for systemic flexibility to incorporate the lessons of a learning process is further enhanced because JI is not the ultimate objective of the institutional evolution it initiates. JI will only be successful if it supersedes its foundations through the emergence of more complete regimes. The argument for JI begins in the diplomatic deadlock associated with very divergent expectations about the proper shape of a broad multilateral regime of taxes or tradable permits. It continues with the proposition that the experience of JI should lead toward a revision of such expectations and widening circles of agreement about the issues like baselines and compliance that are the current sources of dissensus. The JI process must then anticipate its capacity to adjust to institutional innovations that lead in the directions that JI is intended to explore. In this sense, an early jurisprudential experimentation with alternative norms in multiple fora and nations, followed by codifications of established practices in national law and international agreements might describe the optimal development path of a global environmental regime.

We can consider the merits of a regime that is designed to learn and evolve by speculating on one possible path of JI development. Let us suppose that the initial applications for JI approval come largely from energy producers because of their disproportionate sectoral interest in prospective carbon emissions regulation. The original project descriptions would be submitted and considered on a case by case basis and would be required to contract for project specific solutions to the baseline, monitoring and compliance, insurance, and evaluation questions. As long as the proposals met all foreign investment and domestic laws of the host country, there would be no need for intricate coordination between the systems of home and host nations. It need not be taken for granted that the resolution of the key issues like the setting of the baseline would be the same for projects in India, Brazil and Costa Rica. In each instance the definition of what constitutes business as usual could be set in the context of a particular political economy whose past history and future trajectories of practices like internalization of social cost, subsidization, corruption, information provision and risks of moral hazard could be individuated and even negotiated as a condition of JI qualification. These parameters might even be set with reference to sub-national regions that display a capacity for independent action from their national governments. Baseline definitions could evolve over time depending on strategic responses and good faith compliance with both contractual obligations and broader political expectations. In effect, the first stage of the JI process would be unilateral and case specific as the dynamics of competitive responses to the evolving application of broad standards were fleshed out.

A second stage in this hypothetical JI development scenario would look toward the growth of bilateral agreements between host/home, home/home, and, perhaps, host/host nations. In host/home treaties, general provisions about baseline definition for all projects in the host country could be negotiated so as to assure the host state a legitimate voice in the standard setting process. Baselines could be set on a conditional and evolving schedule to lead toward environmental improvements and away from the temptations of moral hazard. Such accords would have advantages for host nations since they would promise reductions in transaction costs over project by project approval and would thus offer signing nations a competitive edge in attracting JI projects. Bilateral agreements could also offer an indirect mode of making side payments to those countries which merit equitable recompense for their political commitment to high domestic baselines. If the original treaties are signed with nations seen to be acting in good environmental faith, the early facilitation of project development would increase their share of the environmental service market and foster the growth of complementary industries like financing and monitoring available to JI contracting parties. Accords could also help institutionalize broader markets in host countries by qualifying syndicated or multi-project investment instruments organized by public or private funds for offset credit. Strategic use of accords as rewards for domestic environmental regulation could induce competitive pressure on host nations to define bilateral accords

and, with time, to narrow the gap between first and third world expectations about the allocation formulae for more inclusive market regimes.

Home/home nation agreements that define common standards for JI project certification are also likely to evolve in an institutional regime designed to facilitate learning. For example, if the United States has moved to meet its UNFCCC targets in a more efficient fashion through JI projects whose unit costs of emissions reduction are below those available in Japan or the EC where JI might be more restrictively qualified, it is to be expected that regulatory competition will initiate political and economic pressures to effect some convergence of national environmental rules and procedures. Obviously, there may even be threats to withdraw from the Annex I regime unless some threshold of uniformity constrains the legitimate modes of meeting targets is available to those nations sharing the stabilization goal. However, it seems far more likely that this common threshold can be defined in negotiations between the advanced industrial countries than in a multilateral forum with far more diverse agendas and interests. Again, the result of this competitive evolution of standards is a narrowing of the range of expectations that could advance the prospects for a more complete international regime by restricting the number of contending positions to define the operative provisions of that regime. (It is also possible to imagine OPEC like agreements between potential supplier nations of JI services that establish common negotiating positions on issues like baselines or cartelize asset prices. Until now, this has been a more prevalent theme in the negotiations surrounding the biodiversity treaty than those around climate change. Given the history of commodity agreements and the different national tastes for domestic environmental protection among potential supplier nations, this result may be a less probable outcome of the evolution of the JI process. See discussion below pages.)

A final phase of JI regime development might foresee the growth of both home/home and host/home agreements beyond bilateral agreements toward the creation of minilateral or regional treaties. Among home/host regime this would result in bubbles being placed over contracting jurisdictions within which there was a defined agreement of common JI standards and practices. This prospective harmonization of regulatory practices like baselines and compliance standards would assume that JI jurisprudence has advanced to the point that the basis for an inclusive environmental regime would be far more apparent than it now is. The nature of that jurisprudence would probably depend on the sequencing and competitive evolution of less complete accords. Once minilateral agreements have proliferated, it will be likely that JI has run its useful course. It may then be practical to negotiate more comprehensive, though not necessarily universal, regimes around the reformed range of political expectations. This speculation suggests that the more realistic path to a multilateral environmental order may lie through unilateral, bilateral and minilateral or regional accords. Yet before endorsing its virtues, we should recall that its immediate condition precedent is that national JI regimes be able

to accommodate flexible learning and strategic response capacity. In turn this will require the maintenance of a international legal system where these experimental possibilities have not been cut off by the promulgation of restrictive regulatory codes on permissible national behavior.

Host country issues

In the several meetings of the International Negotiating Committee section on Joint Implementation that have succeeded the signing of the UNFCCC convention the major point of controversy and resistance to JI has been its significance for host countries. In multilateral discussions JI has been castigated as an extension of colonialism and a trap for unwary and unsophisticated third world states that would be unable to understand or effectively manage JI projects. Constraining rules have been proposed, though not yet adopted, to limit the range of nations where JI could be carried out and the percentage of home country emissions that could be offset by JI credits, to reallocate emissions credits from home country investors to host country organizations or credit banks, and otherwise to restrict markets in which JI would organize environmental services. To analyze the appropriate roles host countries might play in the organization of these markets and the regulation of JI investment, we can divide their potential activities into two distinct classes. The first class concerns the incorporation of JI into the general regime for foreign investment which is practiced in the host nation. The second class of activities concerns the capacity of the host country to organize the market for JI projects so as to improve its share of the global market for environmental services and to foster the development of complementary services for JI that will return a larger share of the total value added by these projects to local producers.

1. Should host countries develop special JI regimes?

Much of the thrust of multilateral opposition to JI has centered on the inability of host nations to deal with purported threats to their national sovereignty represented in colorful metaphors of exploitation like "carbon colonialism" or "low hanging fruit". The goal of this criticism is an international regulatory regime that will restrict environmental markets and curtail this threat. On the other hand, this essay has argued throughout that JI is an innovative, but familiar form of foreign investment. If foreign investment whose return is received in money rather than offset credits is well managed by the national regime of the host country, it would follow logically that local concerns would be alleviated as long as JI projects were treated as were more orthodox foreign investment projects that are their monetized analogues. This argument does not imply that all foreign investment projects ought to be subect to exactly the same regulatory controls. For instance, all investments might be similarly treated with respect to toxic waste disposal; only some investments would be subjected to special rules for the management of depletable asset

stocks. My point is that operative distinctions between foreign investments ought to relate to criteria other than the form in which they yield returns.

The irony of the oppositional tone of much of the multilateral JI debate is twofold. First, it is taking place in an era in which the general reputation of the value of foreign investment is ever more positive. The restrictive attitudes to foreign investment that characterized much of the last decades of *dependencia* and socialism have been receding almost universally. Nevertheless, JI projects are singled out in the post-Rio diplomatic forum for limitations in international markets that are fading away for other forms of foreign investment at the national level. Second, one of the recurrent themes of the third world disinclination to accept comprehensive market instruments as the basis for a climate change regime is its intrusion upon national sovereignty. Yet that same sovereignty is exercised daily and independently by national public authorities that decide how they will intervene in private markets to reflect total social costs and benefits in their own jurisdiction. If foreign investors or governments were to interfere in the local exercise of these decisions, they would be rightly assaulted as neo-colonialists under the sovereignty principles commonly asserted. However, the case against JI flies in the face of the usual insistence that all nations have the capacity to manage their domestic resources and possess the voluntary prerogative to yield this capacity only through treaty. It seems incoherent to claim that the competent control of monetized foreign investment is at the heart of the protection of sovereignty while the capacity of those same nations to make autonomous decisions on JI or non-monetized investment should be restricted in order to preserve the same principle.

Four arguments are most commonly heard why host countries need special regulatory regimes for JI. The include asymmetrical negotiating capacity, carbon colonialism (asset mispricing), low hanging fruit (depletable asset management), and technology forcing. These same arguments are advanced to justify the idea that the Conference of the Parties of the UNFCCC Convention should adopt rules that limit the scope of JI to preclude the possibility that national regulation will not be able to meet the special challenges JI poses. We can examine these arguments sequentially and, in each case, evaluate their merits with respect to two dimensions. First, we can consider the question of whether individual host nations face dangers associated with JI which they have been unable to resolve in other forms of foreign investment. If the answer to this question is that there are no relevant differences between the issues posed by the entire portfolio of foreign investment, we can then ask whether it is advisable to pursue accords for multilateral coordination between the various host country investment regimes if national regulation is to be effective.

The arguments for JI's danger are of varying quality. For example, it is said that host nations will receive low prices for the environmental services they supply because they are unable to bargain as well as multinational investors

and lack knowledge of market values. It is true that in the formative period of any market it is to be expected that there will be more variability of transaction prices than would be the case in a deep and established market. However, this variability does not systematically bias the position of buyers or sellers. In the case of JI, there is no systematic reason to believe that the access of host nation sellers to expert legal, financial or scientific expertise is any less than that of investors. The same specialized organizations offer these services to all buyers on an international market. Homogeneity of supply in complementary services for negotiation and project evaluation has been the usual practice in other foreign investment markets for at least several decades. JI cannot be distinguished from the rest of the foreign investment universe in this regard.

Other claims about the regulatory complexity of JI deserve more attention. The first of these may be symbolized by the fear of "carbon colonialism". Since the most publicized voluntary projects that have been initially associated with JI have involved forest management, afforestation or reforestation, it has been asserted that first world investors have sought to convert the third world into a huge biological or atmospheric reserve that denies the host nation the benefits of economic development enjoyed in the North. There are a number of factual misimpressions about such imagery. Identifying JI strictly with forestry ignores the wide range of potentially creditable investment in fuel switching, agriculture, demand side management, improvements in industrial energy budgets, energy technology development, and transportation. It misses the fact that much reforestation does not add to park space, but is focussed on land decimated by pasturage and other traditional agriculture uses that have left the resource unfit for any current alternative use. It is also the case that a modern vision of the forest products industry as a foundation for high value added application and distribution services has proven in nations like Chile to offer a base for economic growth and employment that is more promising than most more traditional and uncompetitive forays into crowded manufacturing markets.

Whatever the facts of forestry investment, what is more important to the argument is the underlying complaint that JI to ought be restricted because the prices of natural resources that attract foreign investors do not reflect the true social value of the assets being transferred. This complaint suggests that the host government in some way is either distorting prices through its own action or is failing to correct prices to reflect real resource values. A number of plausible hypotheses could support this contention. Land or other resource prices in the market could be too low because the host government does not regulate or tax so as to force the internalization of local social costs connected with the environment or health and safety. Alternatively, some large resource stocks may be common pool resources and so overconsumed because of a failure to establish ownership rights and associated proper incentives. But the underpriced appropriation of common property resources is usually associated with their transfer to host nation nationals rather than to foreigners. Once pri-

vate ownership is established, the common pool problem should evaporate, although it is not impossible that those who have acquired an asset too cheaply might be more likely to underinvest in information about actual market value and thereby be more likely to undersell. It may also be true that the host government itself is underpricing natural resource stocks that it controls and allocating them even to foreigners too inexpensively. Where there is a history of corruption or local profiteering from foreign contracts, as was the case with oil concessions in the early 20th century in Latin America, this mismanagement is predictable. Again, resources may be transferred at too low a price if inefficient government subsidies are attached to assets in question. Without a second assumption that there are information asymmetries that favor the multinational party, it is not self-evident why the value of any subsidy would not be capitalized into the sale price and captured by the local owner rather than the foreign investor.

The argument against transacting in misregulated economies may become more systemic and subtle (see Chichilnisky) in suggestions that natural resource prices in the market may be depressed below their optimal shadow price because a wide range of governments across the third world have underestimated the potential value of development strategies based on manufacturing and services. If the consequent public policies have led to the oversupply of natural resource commodities and their derivative products, the price of tied inputs would be reduced below its real social cost. In this vein, the campaign against conservation services acquired through JI seems to aim at economic activities that do not produce labor intensive production processes. Even if we assume that all expectable externalities have been properly included in resource prices and the price offered for conservation still represents the highest market value for the resource, the carbon colonialism charge would probably still lie because of presumptive employment effects. If it could be shown that the multiplier effects from conservation services were below those of other potential uses of the resources, it could be the case that regulatory adjustment of investment flows toward alternative projects would be preferable. Nevertheless, it is interesting that if we examine the range of domestic investments or foreign investments other than JI, there are not normally public regulatory processes that rank projects by their multiplier values and exclude those with lower priorities. The trend in the 1960's to demand appropriate technologies that made better use of local labor supplies is no longer in vogue and was, at its height, rarely directed at national, as opposed to foreign, investors. In its avatar as employment policy, the fear of carbon colonialism may be a vestige of an era in large part left behind.

A related, equally colorful, though analytically distinct, charge against JI projects is that they are attempts by Northern countries to "pick off low hanging fruit". The claim depends on a distortion of a basic truth about all market based instruments proposed for the international environment. JI, like tradable permits or taxes, derives its merit from the economic tenet that the

total costs of any valued activity should be minimized. If a European energy firm can hold its carbon emissions to a prescribed level by improving agricultural production in India with lower total expense than it could install new technology to scrub its waste output at home, the advocates of market instruments see this as desirable. To point to the fact that the least costly alternative projects are exhausted first in a market scheme is to say that the market is working. This virtue is transformed to a threat by JI opponents who note that many of the least cost opportunities for greenhouse gas reductions are in the third world. They argue that since only the Annex I nations have assumed in the UNFCCC Convention obligations to stabilize their emissions, they will act through open international markets to exhaust these environmental assets. In effect, they see developing nations as the owners of fixed stocks of depletable resources that will be used up by a putative date in the future when all signatories of the Rio Convention will have to take on liability for climate change issues. They argue that current sales of these lost cost assets (low hanging fruit) should be precluded so that the stock can be maintained for anticipated national appropriation.

There are several interesting, but contestable, perceptions that underlie the low hanging fruit case. First, it is not clear that JI projects are like other more familiar depletable asset stocks such as oil in the ground. Oil pools are bankable in the sense that their utility and accessibility are not normally dependant on the time of their extraction. The opportunities to harvest environmental services may be available only in limited time windows. Interdependency with other resource uses may constrain the ability to stockpile such assets due to the complementarity of their alternative uses with path dependent development elsewhere in the economy. In any case, since non-bankability argues against restriction of the international market, for host nations the force of the low hanging fruit logic must rest on a judgement that JI or more complete international markets pose an unacceptable risk that national asset stocks will be sold at too low a price to first world investors. If we assume that low cost, depletable environmental stocks are bankable, the tradeoff between their current sale and deferred use is given by the expected relation between the price of the asset and the market interest rate. If asset owners or public authorities who regulate the rate of depletion as a collective good believe that the discounted value of deferred uses of the resource is greater than the present value obtainable in market transactions, they will acquire and bank or require the banking of the asset. If not, sale is the rational choice. Futures markets will facilitate such decisions where they exist, but there is no obvious reason why host national governments or property owners are any less able to handle this economic management question than the others they routinely face. Again, if it were asserted that these same nations ought to give up their autonomous power to manage other asset stocks like oil reserves because the analytics of the depletion problem were too tough for them, the intrusion on sovereignty would be reviled as patronizing and anachronistic.

A final brief examination of the case against JI from the principle of "technology forcing" reinforces the conclusion that the central sources of the resistance to market instruments are a distrust of markets combined with a lack of belief in the capacity, will or legal right of host nations to correct their failures. What I contest here is not the accuracy of these propositions, but their selective application in these particular instances. Technology forcing restrictions against JI build on the insight that there will often be a tradeoff or substitution between the development and applications of new technological solutions to the greenhouse gas emissions problem and investment in the range of JI projects. It is sometimes argued there is a moral obligation on polluters to deal with emissions on site (the Clean Up at Source Principle). Such an asserted principle flies in the face of the least total cost maxims of economics that assume there is value to be realized precisely because there is no necessary link between the separate markets for production and environmental services. There is also a secondary hypothesis in the technology forcing argument that the market may err in valuing the real rate of substitution between investment in technology innovation and in JI projects. Here the failure to correct this purported mistake is probably best assigned to the home government which presumably is overcrediting the less efficient JI investment. Wherever responsibility for the failure is laid, the harder challenges for this argument are two. First, it is unclear why it is believed that private actors will not correctly evaluate the total costs of the technology/JI tradeoff. Nor is it apparent that there is any public agency with better information than firms to make such technology policy decisions. Second, even if there are high returns to technology investment in the environment, it is quite likely that these gains will be more concentrated in developing countries than in the North. Because markets, including those that manage the substitution of competing factors and technology, are more imperfect in less productive economies, it is probable that investments in technology innovation in the South will yield a higher return than those in the North. Once we give up the prejudice that JI or other market instruments are tightly tied to forest conservation, it is the expansion of these international markets that should stimulate the incentives for investors to seek out and develop these technology based opportunities.

The expansive reasoning that JI should be restricted because it exacerbates endemic problems of price distortion, depletable stock management, or technology substitution simply heighten the stakes in what is really a single and singular argument. The logic of the case is more accessible than its validity. First, we can note that the claim that market prices in host nations are wrong and should be publicly corrected if they are to provide a legitimate basis for international transactions does not apply only to natural resources, but potentially to all assets. If regulation is structurally miscalculated or absent, its problems will extend to other sectors as well. Second, the misallocations ensuing from inefficient regulation would be no better or worse with JI than with other forms of foreign investment. Third, if these assertions about the quality of local government are true, their correction lies in the hands and purview of

the host nation. Multinational investors, short of being complicit in acts of corruption or other invasions of the political autonomy of the host government, are in this regard effectively price takers. Fourth, the proposal that the way to deal with the internal disabilities of host nations is to rule segments of the market out of bounds by means of international restriction, as proposed by JI opponents, would be considered an affront to sovereignty in normal political discourse.

What would seem far more consistent with the usual strongly propounded tenets of sovereignty would be that: 1) the international community rely on the ability of each host nation to decide for itself the optimal use of its own resources; 2) the international community extend analytical and operational aid, where requested, to host nations seeking to improve their internal regulatory capacities; 3) that the local regulatory treatment of JI be no different than that extended analogous classes of monetized foreign investment; and 4) foreign investors comply strictly with all locally enacted rules in the host nation. In listing these guidelines I do not mean to laud or endorse national sovereignty as the permanent organizing axiom of international order. My own view is that phenomena like climate change expose the debility of norms that reflect older theories and images of nationalism as the foundation of political jurisdiction. Rather, these guidelines suggest that as long as the commitment to national sovereignty is taken seriously by those actors, including JI host nations, who value it, there is nothing in JI that should cause them to deviate from that ideal.

If the recognized discourse of national sovereignty favors the integration of JI projects into comprehensively regulated domestic markets rather than the international restriction of JI markets in particular, there may still be good theoretical reasons to think about the value of compacts between host nations. It is possible that the capacity of host nations to regulate efficiently their domestic markets would be aided by agreements that coordinated the regulatory policy of these states. The object of such coordination would be to prevent a "race to the bottom" or a dynamic process in which competition between host jurisdictions causes them to lower their effective levels of regulation and thereby undoes the ability of any of them to take the measures they would otherwise prefer to solve their public goods problems. The analysis that predicts there will be races to the bottom and counsels the strategy of adopting reciprocal binding limits on domestic political action is complex. If a nation regulates efficiently so that the total cost of the incremental (marginal) unit of production exceeds the total benefit, it is not self-evident that it should adjust its level of regulation and allow the production of that unit simply because some other jurisdiction does so (Revesz). At the same time, the realities of national politics often include an asymmetrical ability of groups which bear different environmental and employment costs to marshall their influence in policy decisions. In addition, if investments are lumpy, information is costly and the complementary analytic requirements for optimal regulation are hard

to assure, temptations to reduce chosen levels of regulation and attract flows of funds may be powerful. In these conditions, inter-jurisdictional pacts to protect local regimes may be appropriate.

The case for coordinating compacts between host nations does not, however, imply that such limitations ought be set up by means of a compulsory multilateral regime that restricts JI transactions. First, there may be nations that wish to reserve a complete autonomy in their domestic market for environmental services because they make very different evaluations of regulatory tradeoffs than do competing polities. Second, there are numerous other regulatory markets, such as the control of toxics, that are subject to race to the bottom pressures. Where common multilateral regulatory standards are achieved, as in the Basle Convention on Toxic Wastes, they are related to a functional problems and extend to all economic activity in which these problems appear. These comprehensive agreements cover equally all investment that may destabilize national processes designed to internalize social costs and are not directed at one class of activity such as JI. Finally, there is always a risk that international compacts to protect national regulatory systems can serve as a cover for price and output cartels. For example, many observers of the GATT regime which legitimates anti-dumping actions believe that the principal effect of the Treaty is less the control of predatory pricing than the imposition of cartelized grey markets. Multi-party commodity agreements and other price fixing arrangements are common in the international economy. They could evolve as well in the market for environmental services with familiar allocative and distributional effects. In the absence of a better case that the multilateral regulation of JI is the proper mechanism to deal with the general effectiveness of host country domestic regulation, it would seem wiser to limit the appropriation of UNFCCC protocols as instruments to manage the development of international environmental markets and compel emergent supply cartels to establish their own organizations.

The lesson of this argument is that host countries ought not set up a special legal regime for the regulation of JI at either the national or the international level. Rather their stance toward the opening of the JI market should be to incorporate JI foreign investment into the more comprehensive rules and procedures that are used for more traditional forms of investment, domestic and foreign. If there are particular controls for depletable assets or social cost internalization that are applied to other transactions, so they should be applied to JI. Where deregulation or a lack of regulation is the dominant policy for other sectors, so should it be for JI in those sectors. A parallel position should be assumed with regard to international agreements. Where national regulation of the environment or industrial relations or occupational health and safety standards or competition policy needs to be fortified by coordination among competing national systems, it is appropriate to submit JI projects that touch on those questions to the same pacts. The mistake is to imagine that JI poses problems for host countries that require idiosyncratic treatment. It is exactly

this failure to recognize the familiar within the innovative that will impede the experimentation and learning about market instruments for the environment that JI should initiate.

2. Actions to develop JI markets

In those host countries where foreign investment is deemed to be consistent with national development strategies, it is possible to imagine a variety of steps that might be taken to facilitate the operations of JI projects. One class of such activities is to increase coordination with home country authorities responsible for crediting or granting offsets to investing organizations. This facilitation may relate either to reducing the transaction costs of entry into JI transactions or to assisting in the legitimation of JI as an environmental instrument through quality control and process access.

Transaction time and expense in the approval of JI projects by home nations can be lowered if information about baseline definition in the host country is more readily available. Host nations may supply such information by having their representatives appear in JI administrative proceedings on a case by case basis to respond to inquiry and to provide an authoritative voice on issues like equity claims or subsidy policy. Alternatively, these same goals may be achieved not through interpleading of the potential host state, but by means of the signing of bilateral accords that establish pre-negotiated generalized standards and commitments for the evaluation of JI proposals. In addition, either case by case intervention or bilateral agreements can be useful in assuring the efficiency, as well as the perceived fairness, of processes for monitoring JI projects for compliance with contractual terms. In part, this can occur through informal or treaty arrangements for collaboration between government agencies in the host nation and investigating bodies from the home country. In part, host country environmental agencies may take on some role in policing and reporting violations of the conditions assumed by investors in acquiring offsets.

In addition, as is true of enforcement mechanisms in the Convention for International Trade in Endangered and Protected Species, NGO's in the host country may play a key role assessing JI performance. NGO's may gain access to the administrative process in home nations that certifies qualification either directly or through a mediated process in which the complaints of NGO's are heard first in the host nation and, if found valid, then registered by official intervention in the home country evaluation proceedings. This latter path is followed, for example, in the NAFTA side agreements on labor and the environment. Either direct or mediated monitoring by the host state will always be suspect due to incentives for national authorities to expand their global share of JI markets through lax enforcement. Given the distrust that home country environmental organizations will have for JI projects, it would be worthwhile for host nations seeking expansion of market share to invest in reputation

effects. Institutionalizing measures to support the recognition of multiple voices, including leading local NGO's, in the process of compliance monitoring may enhance these national assets.

A second means by which host countries can affirmatively develop the JI market is through the provision of expert complementary services. These may include organizations to finance, insure, provide legal assistance or monitor potential JI projects. Where local institutions already exist to service monetized foreign investment, what may be needed is only adaptation of existing specialized knowledge to the differentiated exigencies of JI. In those host nations where the growth of a market for environmental services opens opportunities for specialization and scale not previously available, greater public effort at industrial policy may be required. In all the cases the usual controversies over the virtues and vices of allowing foreign providers in these expanding sectors will be replayed. However, one area of special competence may merit careful consideration for host countries. It may be the case rather quickly in the evolution of JI markets that transaction costs for investors may be lowered by the development of a range of syndicated projects or tradable instruments in portfolios of JI projects. Because the ability to acquire offset credit from the purchase of such an instrument will require close coordination between the marketer of the instrument and the home country crediting authority, it may be that multi-project assets may be initially sold by or through the host government. The problems posed by monitoring and evaluating the portfolio of projects represented by generalized instruments are sufficiently complex that proposed solutions may at first be incorporated in bilateral accords. Making a credible and creditable market in more advanced JI instruments should be treated by host governments as a separable issue from the wider universe of JI projects negotiated between private parties. It would be a mistake to interfere with the smooth operation of the latter transactions in the hot pursuit of the specialized demands of the former. Generalized instruments do, at the same time, constitute, a prospect for market growth potentially worth the development of ancillary institutional arrangements.

3. The roles of the private sector in the development of JI

The primary role of firms, acting individually or jointly, is to develop and implement JI projects. Since the underlying assumption of this analysis is that learning how to formulate and go beyond an effective JI regime depends on the accumulation of experience, the most valuable contribution that private firms can make is to build their portfolios to the point that JI investment is as routine as are other forms of foreign investment. This will certainly impose some measure of start up costs on JI market participants. Since new legal, organizational and scientific knowledge must be produced and administered, the uncertainty about the magnitude of these expenses always constrains experiment with innovation. Especially in the early period when home country systems that rely on a common law jurisprudence or case by case approach to

evolve standards for JI accreditation are still primitive, projects will require firms to support internal entrepreneurial efforts that would develop the organizational capital to deal competently with JI transactions. However, in as much as the most cost effective projects should also be available when the international market for climate change services first becomes accessible, there may be offsetting benefits to these lumpy investments in transactional innovation.

The private sector may also perform a complementary role to investment in JI projects per se. Specialized firms offering expertise and economies of scale in scientific monitoring, JI project financing, insurance, legal services, and the brokering of syndications or generalized markets should proliferate on a competitive basis. In some cases, these firms would have locational cost advantages in host nations. In other cases knowledge advantages may push toward home country specialists branching out from other technologies already developed. There is no need to predict or impose any particular topography of the eventual shape of the industry that supplies environmental services. With the prospective development of freer markets in service provision under the General Agreement on the Trade in Services, this new sector may be one of the first to grow under conditions that foster efficiency. In sum, businesses should do for JI what they do best in general: 1) search on a global basis for the least cost solutions that are in compliance with applicable legal regimes; 2) propose and carry out projects that yield a competitive return; and 3) be open to investment in novel forms of organization and transaction cost reduction that have been at the heart of modern productivity.

The ideal role of business or other non-profit associations with a concern for market instruments as environmental tools should be to husband the development of efficient and legitimate JI projects and to nurture the gradual process in which JI mutates into deep and comprehensive markets. In the agenda of activities that contribute to these ends we might list the following:

1) Act as a voice of non-government interest groups in the International Negotiating Committee and the Council of the Parties of the Rio convention to forestall the imposition of restrictive conditions on the flexibility of national JI regimes to experiment with different types and standards of market organization.

2) Work with business groups and public agencies in home and host countries to reduce the misunderstanding and lack of familiarity that now relegate JI to the domain of the exotic and thereby limit the growth of projects essential to the evolution of efficient markets.

3) Support with financial and organizational resources the reduction of common transaction costs associated with new corporate and governmental procedures that attend the legal, organizational and scientific

protocols for creditable JI projects. Especially in the early years of JI when regulatory standards, administrative channels, techniques for project evaluation, and legal forms for JI investment are not yet routinized, there will be much inter-organizational common knowledge that must be created under conditions where free riding is likely. Subsidization of the development and diffusion of this common capital by collective associations will facilitate the emergence of these new markets.

4) Serve as organizers of sub-sectors of business that may have disproportionate interests in the nature of home country JI regimes. We have argued that in the absence of formal and certain national drivers that offer offset credits as a return on JI investment, it is likely that some industry groups will have special incentives to advance the JI regime. The coordination of intra-sectoral action at both the national and international levels may be critical to its development.

5) Serve in the foundational period of JI markets as a broker of links between potential partner firms in host and home countries interested in particular genres of technology and investment. Business associations can maintain and tend the operations of networks of private enterprises which are accumulating experience with JI markets and complementary services to increase diffusion of organizational innovations in the field. As discussed under point 6 below, the role for industry group or other non-profit organizations in this arena may eventually be supplanted by the growth of private service providers.

6) Create an internal research group or support the action of associated research groups to provide clearinghouse services about the comparative national development of legal standards and procedures that are evolving in the public regulation of JI. Especially where national authorities may be relying upon the learning value of a common law jurisprudence in the formation of JI rules and where there is a cross-national proliferation of bilateral accords and other decentralized efforts to structure the JI market, the development of competent and inclusive information services will be essential to the effective diffusion and refinement of public policy in the leading home and host countries, as well as to private investors considering how to arrange a JI portfolio.

7) Work as a mediating organization between the governments of home countries and between host and home countries during the expected period when dissonant legal standards for crediting JI projects and different mixes of economic instruments including JI should be expected to arise in the expanding environmental services market. Rather than treating diversity in policy as a failure of the regime of JI and economic instruments, the business community should emphasize programs to enhance the understanding of the international dynamics of regulatory

competition in environmental markets and actively lobby to facilitate the negotiation of common regimes that will eventually form the basis for comprehensive market organization.

Summary of main points

1. Economic instruments, taxes and property rights, are the preferred instruments with which to build an international climate change regime.

2. Because of political differences and cultural factors that characterize the UNFCCC multilateral forum in which climate change is negotiated, it is highly unlikely that any prospective agreement on the constitution of a prospective comprehensive regime will soon be forthcoming.

3. In these circumstances, the better path to this complete regime lies through a narrowing of the wide range of current divergent expectations by a learning process conducted by means of concurrent action in many local forums acting under competitive pressures. Joint implementation is a principal instrument for this indirect approach to a comprehensive regime of economic instruments.

4. In order for joint implementation to function in this way, international negotiations must not close the door to its experimental use. Consequently, any UNFCCC protocol on joint implementation should not restrictively regulate this market.

5. The home governments of investors in joint implementation should develop on a common law basis standards for the certification of high quality and marginally incremental projects.

6. The host governments of jurisdictions which receive joint implementation funds should treat these projects under the same rules and standards they use for other foreign investments. It is the sovereign prerogative of such governments to decide if and to what extent they wish to participate in these markets.

7. The private sector should seek out least cost solutions in compliance with local law in which creditable joint implementation constitutes a major or minor part of the return on their investments. Business associations may be active in the early years of these formative markets to faciliatte or subsidize the extraordinary costs associated with a new regime.

Biographical Note

Thomas Charles Heller is Professor of Law at Stanford Law School and Professor at the Stanford Institute for International Studies. Professor Heller is a specialist in the areas of International Political Economy, Legal Theory and Comparative Legal Systems, with an emphasis on the role and evolution of the modern state. His present teaching and research concentrate on problems of regional integration, nationalism, and the development of the global legal regime for climate change. Heller's environmental work is done in association with the World Business Council for Sustainable Development in Geneva.

Professor Heller received his undergraduate degree from Princeton University and his law degree from Yale. He did graduate work in economics at Yale. He was an associate with the firm of Cleary, Gottlieb, Steen and Hamilton in New York and Brussels and was an attorney-advisor to the governments of Colombia and Chile from 1968-71. He became Professor at Stanford Law School in 1978 and at the Institute for International Studies in 1992, following appointments at the Yale Law School as a Fellow in Law and Modernization, as a faculty member at the University of Wisconsin-Madison, and as a Visiting Professor and Fellow in Law and Economics at the University of Miami. Professor Heller was named a Kellogg Foundation National Fellow from 1981-84, served as Maître d'Etudes at the Maison des Sciences de l'Homme in Paris in 1989. He was a visiting researcher at the Economic Commission for Latin America and the Caribbean in Santiago, Chile in 1992 and Jean Monnet Visiting professor at the European University Institute in Florence in 1993 and 1994.

From 1985 through 1992 Professor Heller was Director of Overseas Studies at Stanford, where he was particularly involved with the establishment of the Stanford Japan Center in Kyoto – the first American education and research center in Japan. He is the author of numerous articles in the fields of taxation, legal theory, economic integration and labor migration.

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